## REMARKS

**Rejoinder of Method Claims**

In the June 9, 2005 Office Action, the Office imposed a restriction requirement against claims 1-38, and required that an election be made between:

> Group I: Claims 1-16, drawn to a sacrificial silicon-containing layer etching composition; and
>
> Group II: Claims 17-38, drawn to a method for removing silicon-containing substance.

Applicants elected Group 1 including claims 1-16 and request that when the product claims 1-16 are found allowable, all claims that recite a method of making or using the product be rejoined and be examined under the provisions of MPEP §821.04. Such rejoinder would be fully proper under these circumstances because when the product claim is found allowable, applicant may present claims directed to the process of making and/or using the patentable product for examination through the rejoinder procedure in accordance with MPEP §821.04, provided that the process claims depend from or include all the limitations of the allowed product claims. In the present application, all method claims have been amended to recite the composition of claim 1. Thus, consistent with the provisions of the MPEP §821.04, when the product claims 1-16 are found allowable, the withdrawn method of use claims 17-38 may be rejoined for examination.

**Rejection of Claims on Reference Grounds, and Traversal Thereof**

In the August 24, 2005 Office Action:

claims 1-7, 10-12, 14 and 15 were rejected under 35 U.S.C. §102(e) as being anticipated by Xu, et al., USPGPUB 2003/0125225, hereinafter Xu;

claims 8 and 9 were rejected under 35 U.S.C. §103(a) as being unpatentable over Xu, et al. in view of Mullee, U.S. Patent No. 6,306,564 (hereinafter Mullee); and

claims 13 and 16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Xu.

These rejections are traversed in application to the claims as amended herein. The patentable distinctions of the amended claims over the cited references are set out in the ensuing discussion.

**Rejection under 35 U.S.C. §102(e)**

Claims 1-7, 10-12, 14 and 15 were rejected under 35 U.S.C. §102(e) as being anticipated by Xu. Applicants assert that the cited reference is not anticipatory of the presently claimed invention.

Anticipation under 35 U.S.C. § 102 requires the presence, in a single reference, of each and every element of the claimed invention, **arranged as in the claim.** *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984). The compositions described by Xu fail to meet this standard.

Applicants' claim 1 recites:

> 1. A sacrificial silicon-containing layer etching composition, comprising a supercritical fluid (SCF), at least one co-solvent, at least one etchant species, and at least one surfactant, wherein the etchant species comprises at least one bifluoride compound selected from the group consisting of ammonium bifluoride and tetraalkylammonium bifluoride ($(R)_4NHF_2$), wherein R is a $C_1$-$C_4$ alkyl group.

As can be easily determined, the composition set forth above includes a bifluoride etching compound and the cited reference provides no disclosure, teaching or suggestion for use of such an etching compound. As such, the cited reference is not an anticipatory reference. Accordingly, applicants respectfully request the withdrawal of the rejection under 35 U.S.C. §102(e).

**Rejection under 35 U.S.C. §103(a)**

1. Claims 8 and 9 were rejected under 35 U.S.C. §103(a) as being unpatentable over Xu, et

al. in view of Mullee. Applicants submit that the proposed combination does not meet the necessary requirements to show *prima facie* obviousness.

The Xu reference which was published within the one year time period previous to the filing of the present application is within the time frame described under 35 U.S.C. §102(e) and was commonly owned by Advanced Technology Materials, Inc. at the time of filing of the present application. As such, Xu must be disqualified under 35 U.S.C. §103(c) from being used in a rejection under 35 U.S.C. §103(a) against the claims of the pending application. *See* MPEP § 706.02 (l)(1); MPEP § 706.02 (l)(2).

The Mullee reference alone or in combination with the disqualified Xu reference does not defeat the patentability of the presently claimed invention. Notably, Mullee does not teach or suggest the use of a surfactant in the composition.

Surfactants are defined as:

> "usually organic compounds that are amphipathic, meaning they contain both hydrophobic groups (their "tails") and hydrophilic groups (their "heads"). Therefore, they are typically sparingly soluble in both organic solvents and water." (See, http://en.wikipedia.org/wiki/Surfactant)

Further, it is well known in the art that the hydrophobic portion of a surfactant compound generally has greater than six carbon atoms (see, e.g., Www.physchem.ox.ac.uk/~rkt/topics/surfactant.html).[1]

Mullee teaches the inclusion of NMP, diglycol amine, hydroxyl amine, tertiary amines, catechol, ammonium fluoride, ammonium bifluoride, methylacetoacetamide, ozone, propylene glycol monoethyl ether acetate, acetylacetone, dibasic esters, ethyl lactate, $CHF_3$, $BF_3$, other fluorine containing chemicals, acetone, diacetone alcohol, DMSO, ethylene glycol, methanol, ethanol, propanol, or isopropanol (see Mullee, col. 4, lines 12-28) in the $CO_2$-containing composition, **none of which have been suggested as surfactant or qualify as a surfactant.**

[1] see also, *Kirk-Othmer Concise Encyclopedia of Chemical Technology*, pg 1143, which states that the hydrophobic group generally consists of a hydrocarbon chain containing ca 10-20 carbon atoms.

Furthermore, Mullee does not motivate, teach or suggest the removal of silicon-containing substances from the substrate using an SCF-based composition, as claimed by applicants. Instead, Mullee discloses the removal of photoresist,[2] its residue and/or organic contaminants off the surface of the semiconductor wafer. Accordingly, Mullee is completely devoid of any motivation, teaching or suggestion relating to the removal of silicon-containing substances from the substrate.

Accordingly, applicants request the withdrawal of the rejection claims 8 and 9 for obviousness.

2. Claims 13 and 16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Xu. As discussed above, The Xu reference which was published within the one year time period previous to the filing of the present application is within the time frame described under 35 U.S.C. §102(e) and was commonly owned by Advanced Technology Materials, Inc. at the time of filing of the present application. As such, Xu must be disqualified under 35 U.S.C. §103(c) from being used in a rejection under 35 U.S.C. §103(a) against the claims of the pending application. *See* MPEP § 706.02 (l)(1); MPEP § 706.02 (l)(2).

In light of the above discussion and the fact that Xu does not qualify as competent prior art and Mullee does not teach or suggest each and every recited element of applicants' claimed invention, applicants submit that the Office has not met its burden of establishing a *prima facie* case of obviousness. Accordingly, applicants respectfully request that the rejection of claims 8-9, 13 and 16, on the basis of obviousness, be withdrawn.

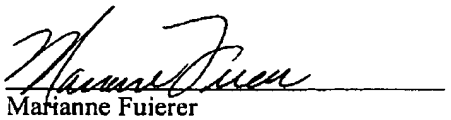
**Conclusion**

Applicants have satisfied the requirements for patentability. All pending claims are free of the art and fully comply with the requirements of 35 U.S.C. §112. It therefore is requested that Examiner Umex-Eronini reconsider the patentability of all pending claims, in light of the distinguishing remarks herein and withdraw all rejections, thereby placing the application in condition for allowance. Notice of the same is earnestly solicited. In the event that any issues

[2] disclosed as including Novolak (M-Cresol formaldehyde) or etch-resistant poly coatings such as poly isoprene, poly-(methyl isopropenyl ketone) (PMIPK), or polymethyl methacrylate (PMMA).

remain, Examiner Umex-Eronini is requested to contact the undersigned attorney at (919) 419-9350 to resolve same.

Respectfully submitted,



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